CLAIMS

WHAT IS CLAIMED IS:

1. A passenger entertainment system for use in distributing audio channels to passenger entertainment stations on an aircraft, the passenger entertainment system including an audio system comprising:

digital encoding circuitry configured to receive a multiplicity of audio channels and to digitally encode each of the multiplicity of audio channels to thereby provide a multiplicity of digital audio channels;

first layer time division multiplexers each receiving a different plurality of the multiplicity of digital audio channels as inputs, wherein each of the first layer time division multiplexers combines its corresponding plurality of digital audio channels with a synchronization and control channel into a single sub-channel having a data rate higher than a data rate of the digital audio channels;

a second layer time division multiplexer receiving as inputs the sub-channels from each of the first layer time division multiplexers, wherein the second layer time division multiplexer combines the sub-channels with a synchronization and control channel into a composite data stream having a data rate higher than the data rate of the sub-channels; and

modulation circuitry coupled to the second layer time division multiplexer, the modulation circuitry modulating a first radio frequency (RF) carrier signal with the composite data stream to generate a modulated RF signal audio system output.

2. The passenger entertainment system of claim 1, and further including a video system which modulates each of a plurality of video channels on one of a plurality of different RF carrier signals, and which transmits the plurality of modulated RF carrier signals to the passenger entertainment stations over a data network of the passenger entertainment system.

3. The passenger entertainment system of claim 2, wherein the data network comprises coaxial cables coupled to the video system and to the passenger entertainment stations.

4. The passenger entertainment system of claim 2, wherein the data network comprises a wireless wideband RF low power transmitter and a plurality of receivers, each located at individual passenger locations.

5. The passenger entertainment system of claim 2, wherein the modulation circuitry of the audio system is coupled to the data network and transmits the modulated RF signal audio system output over the data network with the plurality of modulated carrier signals from the video system.

6. The passenger entertainment system of claim 5, wherein the digital encoding circuitry is further configured to digitally compress each of the multiplicity of audio channels to thereby provide the multiplicity of digital audio channels.

7. The passenger entertainment system of claim 6, wherein the digital encoding circuitry is configured to digitally encode and compress the audio channels into a Moving Picture Experts Group (MPEG) format.

8. The passenger entertainment system of claim 7, wherein the digital encoding circuitry is configured to digitally encode and compress the audio channels using MPEG-2, layer 2 encoding at a data rate of approximately 128 Kbits per second.

9. The passenger entertainment system of claim 8, wherein each of the first layer time division multiplexers is configured to combine approximately 31 digital audio channels and a 128 Kbits per second synchronization and control channel into the single sub-channel at a data rate of approximately 4.096 Mbits per second.

10. The passenger entertainment system of claim 9, wherein the second layer time division multiplexer is configured to combine approximately 15 sub-channels and a 4.096 Mbits per second synchronization and control channel into the composite data stream at a data rate of approximately 65.44 Mbits per second, the composite data stream containing data corresponding to the number of digital audio channels in the approximately 15 sub-channels of approximately 31 digital audio channels.

11. The passenger entertainment system of claim 10, wherein the modulation circuitry modulates the first RF carrier signal using 128 QAM modulation.

12. A method of distributing audio channels to passengers of an aircraft, the method comprising:

digitally encoding a multiplicity of audio channels into a corresponding multiplicity of digital audio channels;

combining each of different pluralities of the digital audio channels in the multiplicity of digital audio channels into a different sub-channel having a data rate higher than a data rate of the digital audio channels;

combining the different sub-channels into a composite data stream having a data rate higher than the data rate of the sub-channels; and

modulating a first radio frequency (RF) carrier signal with the composite data stream to generate a modulated RF signal audio output.

13. The method of claim 12, wherein a video system modulates each of a plurality of video channels on one of a plurality of different RF carrier signals and transmits the plurality of modulated RF carrier signals to passenger entertainment stations over a data network, the method of distributing audio channels to passengers further comprises transmitting the modulated RF signal audio output over the data network with the plurality of modulated carrier signals from the video system.

14. The method of claim 13, wherein distributing audio channels to passengers further comprises:

selecting the modulated RF signal audio output using an RF tuner coupled to the data network and associated with a particular passenger location;

demodulating the modulated RF signal audio output to obtain the composite data stream;

separating the composite data stream into the different sub-channels;

separating the different sub-channels into the different pluralities of the digital audio channels; and

converting a selected digital audio channel into an audio signal.

15. The method of claim 14, wherein distributing audio channels to passengers further comprises providing the audio signal to audio device controls associated with an audio device associated with the particular passenger location:

16. The method of claim 15, wherein digitally encoding the multiplicity of audio channels into the corresponding multiplicity of digital audio channels further comprises digitally compressing each of the multiplicity of audio channels to thereby provide the multiplicity of digital audio channels.

17. The method of claim 16, wherein digitally encoding and compressing the audio channels further comprises converting the audio channels into a Moving Picture Experts Group (MPEG) format.

18. The method of claim 17, wherein converting the audio channels into the MPEG format further comprises digitally encoding and compressing the audio channels using MPEG-2, layer 2 encoding at a data rate of approximately 128 Kbits per second.

19. The method of claim 18, wherein combining each of the different pluralities of the digital audio channels into different sub-channels further comprises combining approximately 31 digital audio channels and a 128 Kbits per second synchronization and control channel into single sub-channels at a data rate of approximately 4.096 Mbits per second.

20. The method of claim 19, wherein combining the different sub-channels into a composite data stream further comprises combining approximately 15 sub-channels and a 4.096 Mbits per second synchronization and control channel into the composite data stream at a data rate of approximately 65.44 Mbits per second, the composite data stream containing data corresponding to the number of digital audio channels in the approximately 15 sub-channels of approximately 31 digital audio channels.